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Analysis of the morphology of polymer blends using ultrasound

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Abstract. *Over recent years there has been great efforts towards the understanding of the rheology of immiscible polymer blends. It is now well accepted that their morphology, especially the concentration of the inclusions, their size, and their radii distribution, is a very important factor which controls their mechanical properties. The type of blend considered in this study is a polyamide/polypropylene system, in which the matrix is the polyamide (PA6) with inclusions of polypropylene (PP). Different concentrations have been used, as well as different surfactants. These blends give then rise to different acoustic properties, which have been characterized by measuring velocities of propagation and attenuation of ultrasonic waves during flow through a capillary rheometer. A wave propagation theory for viscoelastic emulsions was used to predict the values of the ultrasonic parameters as functions of the concentration, the radii distribution and the frequency when the thermophysical properties of the blend are known. We can therefore deduce the concentration and average size of inclusions, and then return to the morphology of the blends. Comparison with microscopic photographs seems to correlate well with our predictions. This method appears promising and could be used to differentiate between different blends during flow.*

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Influence of ionomeric compatibilizers on the morphology and properties of amorphous polyester/polyamide blends

POLY 129

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The utilization of sulfonated polyester ionomers as minor component compatibilizers in blends of an amorphous polyester and was investigated. The blends were prepared using twin-screw extrusion and compared to solution blends to investigate the eff elevated temperatures and shear mixing on blend miscibility and/or phase behavior. The thermal and mechanical properties of were investigated using dynamic mechanical analysis (DMA) and tensile testing while the phase domain sizes of the solution b respect to ionomer content were studied using small angle light scattering (SALS) and phase contrast optical microscopy. Bina the amorphous polyester and polyamide were immiscible with poor mechanical properties, while blends containing the polyest a minor component compatibilizer showed a significant reduction in the dispersed domain sizes.

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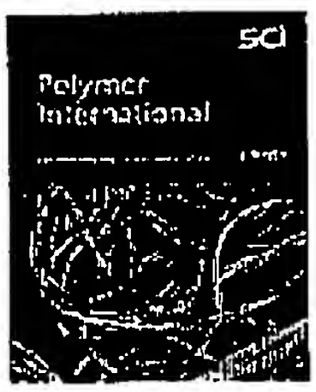

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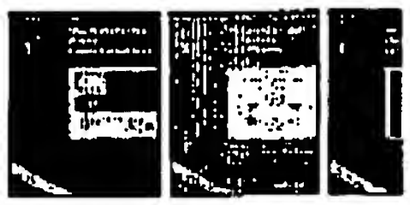

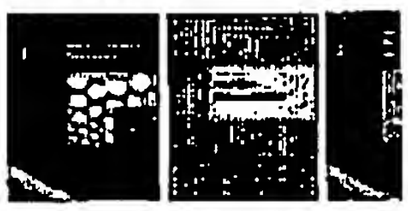

Research Article

Synthesis and properties of reactively compatibilized polyester and polyamide blends

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Keywords

poly(butylene terephthalate); maleic anhydride grafting; blends of PBT and PA66

Abstract

The functionalization of poly(butylene terephthalate) (PBT) has been accomplished in a twin screw extruder by grafting maleic anhydride (MA) using a free radical polymerization technique. The resulting PBT-*g*-MA was successfully used as a compatibilizer for the binary blends of polyester (PBT) and polyamide (PA66). Enhanced mechanical properties were achieved for the blend containing a small amount (as low as 2.5 %) of PBT-*g*-MA compared to the binary blend of unmodified PBT with PA66. Loss and storage moduli for blends containing compatibilizer were higher than those of uncompatibilized blends or their respective polymers. The grafting and compatibilization reactions were confirmed using FTIR and ^{13}C NMR spectroscopy. The properties of these blends were studied in detail by varying the amount of compatibilizer, and the improved mechanical behaviour was correlated with the morphology with the help of scanning electron microscopy. Morphology studies also revealed the interfacial interaction in the blend containing grafted PBT. The improvement in the properties of these blends can be attributed to the effective interaction of grafted maleic anhydride groups with the amino group in PA66. The results indicate that PBT-*g*-MA acts as an effective compatibilizer for the immiscible blends of PBT and PA66.

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